A NEW SPECIES OF PINUS FROM MEXICO[1]

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THE SUMMIT of Cerro Potosí, possibly the highest mountain in the state of Nuevo León, Mexico, is encircled by a timberline made up of two species of pines. One of these is *Pinus hartwegii* Lindl., the dominant timberline species on the high volcanoes of southern Mexico. The other is a dwarf piñon not previously described. The pine which Muller (1937, 1939) called *P. flexilis* James is this species. The localities indicated by Martínez (1948, p. 108) under *P. flexilis* may refer to the new species, but the specimen he illustrated (p. 105, *fig. 72*) includes a cone which is definitely that of *P. flexilis*. We therefore cannot be certain that *P. flexilis* does not also occur on Cerro Potosí, although we did not find it there. The appearance of timberline on Cerro Potosí (FIG. 1) is similar to areas where *P. flexilis* occurs in the Rocky Mountains, but the two species resemble each other only in superficial habit and leaf characters. Their cones are very different. *Pinus flexilis* is a member of the subsection *Cembra*, group *Flexiles* (*sensu* Shaw, 1914). The new species belongs to subsection *Paracembra*, group *Cembroides*. Specimens in the Herbarium of the Chicago Natural History Museum were properly considered to belong to the piñon group by Dr. J. A. Steyermark, who, in 1940, annotated them as *P. cembroides* Zucc. The Schneider specimens in that Herbarium have also been previously determined as *P. quadrifolia* Parry ex Parl.

Pinus culminicola Andresen & Beaman, sp. nov. FIGS. 2–4.

DESCRIPTION OF THE SPECIES. Widely branching shrub 1–5 m. high with dense crown; leaves 5 per fascicle (rarely 4 or 6), 3–4.9 cm. long, 1–1.3 mm. thick, remotely serrulate, incurved in dense clusters at the ends of thick branchlets, glaucous ventrally, blue-green dorsally, stomata on ventral surfaces only, apices rounded and conspicuously cutinized; fascicle sheathes of young leaves 6–8 mm. long, stramineous, later becoming curled into persistent rosettes; conelets ovate, subsessile, single or in pairs, 8 mm. wide, 11 mm. long, rufous-brown, with short-mucronate scales; cones subglobose, 3.2–4.5 cm. long, 3.5–4 cm. wide; cone scales 50–60, inner and outer surfaces (exclusive of apophyses and seed cavities) stramineous; apophyses slightly raised, subrhomboidal, stramineous- to chestnut-brown, laterally keeled, convex above and below the umbo, those of the largest scales 1.8 cm. wide, 1.3 cm. high, 3 mm. thick; umbo dorsal, rhomboidal, minutely appendaged; seed-bearing cavity 9 mm. long, 6 mm. wide; seeds not seen, apparently unwinged, 1 or 2 per scale.

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DIAGNOSIS TYPICI EXEMPLARIS. Frutex, 1 m. altus, coma effusa; folia 3–4.9 cm. longa, 1–1.3 mm. crassa, quinque in fasciculo, ad margines remote serrulata, rigida, incurva densaque, ad terminos aggregata, ventrale glauca, dorsale caeruleo-viridia, cum stomatis solum ventralibus; vaginae 6–8 mm. longae, in brevi tempore crispae-rosulatae; strobilus subsessilis, subglobosus, 4.5 cm. longus, 4 cm. latus; squamae stramineae; apophyses subrhomboideae, fulvo-spadices, a latere carinatae, supra et subter convexae, maxima earum 1.8 cm. lata, 1.3 cm. alta, circa 3 mm. crassa; umbo dorsalis, rhomboideus, cum appendiculis minutis; cavum ubi semen positum 9 mm. longum, 6 mm. latum; semina ignota, evidenter sine alis, 1 vel 2 per squamam.[2]

FIG. 1. Aspect of timberline on Cerro Potosí. The dominant low shrub is *Pinus culminicola*. The erect, longer-leaved pine in the foreground and the tree on the horizon are *P. hartwegii*.

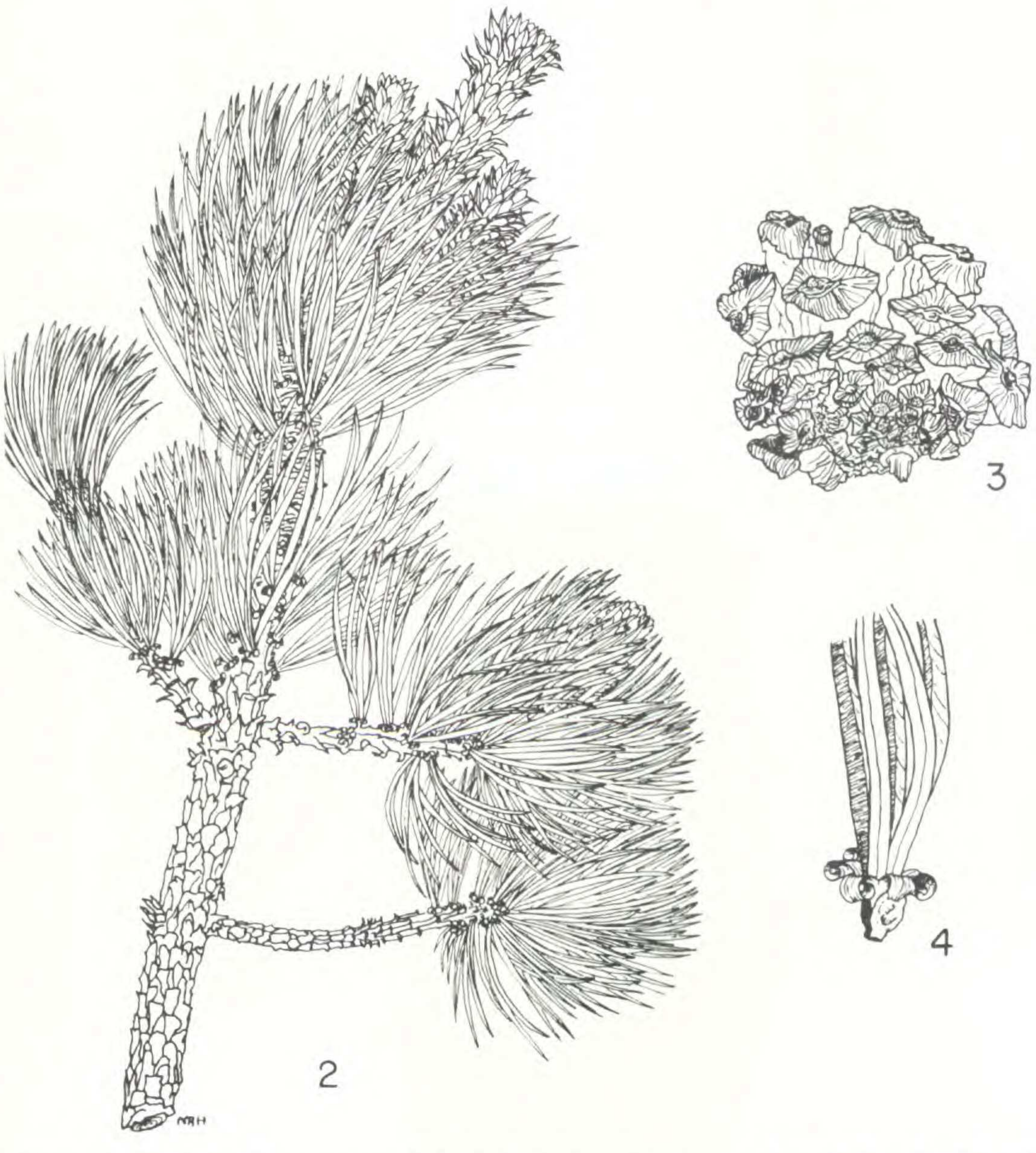
TYPE. **Mexico.** NUEVO LEÓN: Cerro Potosí, near top of mountain, ca. 3600 m. alt., in dense stand at timberline in soil weathered from hard, gray limestone, *Beaman 2675* (MSC 164008, holotype; A, US, isotypes).

OTHER SPECIMENS EXAMINED. NUEVO LEÓN: Northeast summit of Cerro Potosí, ca. 3650 m. alt., *Andresen 666* (MSC); Sierra Madre Oriental, ascent of Sierra Potosí by north hogback about 20 miles NE. of Galeana, alt. 11,600 ft.,

[2] We are grateful to Dr. Mladen Kabalin for editing the Latin diagnosis.

Mueller & Mueller 1241 (A, F, MICH, MO); the peak of Cerro Potosí, Municipio de Galeana, *Mueller 2261* (A, F, MICH, MO); at timberline on Cerro Potosí, Municipio de Galeana, 12,100 ft. alt., *Schneider 957* (F, 2 sheets).[3]

Only three species of piñons (*Pinus cembroides*, *P. nelsonii* Shaw, and *P. pinceana* Gord.) were recognized by Shaw (1914). *Pinus nelsonii* and *P. pinceana* are Mexican species with a limited distribution and conspicuous cone characters. *Pinus cembroides* (sensu Shaw) is widely distributed in the western United States and Mexico. Its variability is such that four



FIGS. 2–4. Branch, cone, and leaf fascicle of *Pinus culminicola*. 2, Branch showing dense, clustered fascicles of incurved leaves and enlarging candle (× 2/3). 3, Cone with details of apophyses and umbos (× 2/3). 4, Portion of five-leaved fascicle with rosulate, persistent sheath (× 4 2/3). Drawings by Nancy R. Halliday.

[3] We appreciate the privilege of examining the specimens in the herbaria cited.

segregate species (*P. cembroides, sensu stricto; P. monophylla* Torr. & Frem.; *P. edulis* Engelm. in Wisliz.; and *P. quadrifolia*) have been maintained by several other authors. Shaw did not attribute much importance to the leaf characters by which these species can be distinguished, but to us they appear to have considerable value. The leaf differences are also correlated with cone characters of diagnostic value (cf. Little, 1950). Likewise, Mirov (1953) noted that the three species of the *P. cembroides* complex which he examined are not the same chemically. Differences between the species are evident in areas where their ranges overlap, suggesting the presence of genetic isolating barriers. The recognition of these taxa as species therefore seems preferable to the alternative of placing them at an infraspecific level.

Pinus culminicola and the four other species of the *P. cembroides* complex are separated from each other by characters of about the same magnitude. Probably the closest relationships of the new species are with *P. edulis* and *P. quadrifolia*. The most conspicuous character for distinguishing *P. culminicola* from its relatives is the five-leaved fascicle. Its cones are larger than those of *P. cembroides*, smaller than those of *P. monophylla*, and about the same size as those of *P. edulis* and *P. quadrifolia*. In habitat *P. culminicola* differs greatly from the other piñons which are found mostly in semiarid regions at the lower limit of forest vegetation. This species occurs in less arid circumstances at the upper forest limit. Probably no other species of piñon occurs as high as 3000 meters, while the lower altitudinal limit of *P. culminicola* is around 3400 meters.

Pinus culminicola and *P. cembroides* are essentially sympatric. The latter occurs abundantly near the base of Cerro Potosí (cf. Martínez, 1948, p. 85). We have compared the collection *Andresen 675* (MSC) of *P. cembroides* from 8 km. south of Galeana, Nuevo León, with *P. culminicola* and found the two species very different in characters of the cones, foliage, branches, and habit. The ranges of *P. culminicola* and *P. cembroides* are altitudinally separated but are close enough that pollen exchange is theoretically possible. Their distinctness is nevertheless maintained.

Since pines are conspicuous plants of considerable economic importance they have been frequently collected and studied. Probably almost all of the species of the genus are already known, but it is not entirely surprising that a new species should be found on Cerro Potosí where endemics are common. For example, Muller (1939) noted that six of 16 species he listed from the alpine meadow were collected for the first time in 1934 and 1935. The high elevation of the mountain (probably *ca.* 3650 meters), its geological age, and its wide geographical separation from the Rocky Mountains and the Mexican volcanoes are responsible for the high rate of endemism. As the flora of Cerro Potosí becomes better studied probably still more new species will be found there.

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